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# MODIS DATA SYSTEM/SOFTWARE VALIDATION PLAN

Overview of All Phases/Versions

A. All validation efforts concerning software and the data system will be the responsibility of the MODIS Science Data Support Team (SDST). All geophysical validation efforts concerning the performance of the science algorithms (as opposed to the software) will be the responsibility of the MODIS Science Team (MST) and MODIS Characterization Support Team (MCST). Exceptions are with respect to some Level-1 algorithms (unpacking and navigation algorithms) and Level-3 algorithms (re-sampling and re-mapping), which are written and tested for performance by the SDST.

B. All validation activities will be coordinated with the MST and MCST, as appropriate.

B. Software written by the MCST and MST will be submitted for integration into the data system and will be tested by the SDST.

C. All software will be subject to configuration management, which will be the responsibility of the . This will include establishing a Configuration Management office, which will enforce software standards, maintain and distribute software revisions, and determine and manage a problem-tracking procedure, and maintain records of problems, fixes, and dates.

E. Review meetings with MST and MCST will be established at approximately 6-month intervals.

F. At least four complete, end-to-end versions of the software will be built, tested, and validated, three pre-launch and at least one post-launch.

I. Version 1 -- 1991-1994. Complete data system for Mike King's MODIS aircraft simulator (Wildfire). Performed entirely within Team Leader Computing Facility (TLCF), by the SDST.

A. Validation activities will consist of
   1. Enforcement of software standards/format requirements
   2. Software integration and testing
   3. Operational acceptance and testing
   4. Interface testing
   5. Operational readiness testing

B. Each of these testing phases will apply to all levels of processing
   1. Level-1 (algorithms developed by SDST (except calibration), and applicable to Wildfire; these are likely to be different from MODIS)
      a. Unpacking algorithms
      b. Calibration software
      c. Navigation algorithms
      d. Band registration algorithms
   2. Level-2 (algorithms developed by MST for Wildfire)
      a. Data product software
      b. Ancillary data input/access/integration algorithms
      c. Data products will be validated by research cruises, land and atmosphere field experiments by MST. SDST will incorporate these data sets into the archive and perform testing in cooperation with MST.
   3. Level-3 (algorithms developed by SDST after consultation with MST)

a. Re-sampling algorithms
b. Earth-gridding algorithms

C. Test data will be exchanged between SDST and MST to ensure consistency of output.
D. Wildfire data will be made available to all interested MST members. Distribution software will be built and tested by SDST.
E. Software documentation will be reviewed for conciseness, accuracy, and coherence.
F. A User's Guide will be written, and will contain the results of the validation tests, and subsequent changes made to the code. It will serve as a record of the validation effort.

II. Version 2 -- 1994-1997. First complete end-to-end testing of operational MODIS data system. Performed entirely within TLCF. Validation of ocean science algorithms (some Level-1 and all of Level-2) will be performed by the MODIS Ocean Team. All other validation functions will be performed by the SDST.

A. Validation activities will only consist of
1. Enforcement of software standards/format requirements
2. Software integration and testing
3. Operational acceptance and testing
(interface control and operational readiness phases are not included for this version)

B. Test data will be simulated (synthetic) MODIS data created by the MST using the following sensor data for input: CZCS, AVHRR, Sea-WIFS, GOES, HIRS, TM, AIS, AVIRIS.

C. Each of these testing phases will apply to all levels of processing
1. Level-1 -- algorithms developed by SDST (except calibration), and applicable to the simulated MODIS data
a. Unpacking algorithms
b. Calibration software
c. Navigation algorithms
d. Band registration algorithms
2. Level-2 -- algorithms developed by MST for the simulated MODIS data
a. Data product software (as much as is available at this time)
b. Ancillary data input/access/integration algorithms
3. Level-3 -- algorithms developed by SDST after consultation with MST
a. Re-sampling algorithms
b. Earth-gridding algorithms.

D. Test data will be exchanged between SDST and MST to ensure consistency of output.
E. Software documentation will be reviewed for conciseness, accuracy, and coherence.
F. A User's Guide will be written, and will contain the results of the validation tests, and subsequent changes made to the code. It will serve as a record of the validation effort.

III. Version 3 -- 1997-launch. Launch ready data system. This is a complete end-to-end data system validation effort of the launch-ready algorithms and data system. It will be performed at the Product Generation System (PGS) by the SDST and is designed to test the actual

algorithms operating from within their actual operational environment.

A. Validation activities will consist of
   1. Software integration and testing
   2. Operational acceptance and testing
   3. Interface testing
   4. Operational readiness testing

   (the emphasis will be on interface control and operational readiness testing).
B. Final operational test of all Level-1 algorithms.
C. Final operational test of all Level-2 algorithms, including integration and initial testing of last-to-come-in data product algorithms.
D. Final operational test of Level-3 algorithms, including any changes resulting from Version 2 testing.
E. Integration and initial test of Level-4 algorithms, and final operational testing.
F. All utility algorithms will be broken out and given final operational testing as individual, stand-alone (as much as practical) components, delivered to the Data Archive and Distribution System (DADS) and given a final check-out.
G. Software documentation will be reviewed for conciseness, accuracy, and coherence.
H. A final User's Guide will be written, and will contain the results of all the validation tests, and subsequent changes made to the code. It will serve as a record of the validation effort in addition to its function as a help manual.

IV. Post-launch validation activities. These activities will be performed within the first 6 months after launch. They are performed by the SDST, MCST, and MST.

A. Level-1 -- SDST responsibility
   1. Unpacking algorithms will be tested for accuracy and consistency.
   2. Ground control points will be used to validate the navigation algorithms. This will include testing of band ground registration in cooperation with MCST.
   3. Calibration software will be tested against test data from calibration sites provided by the MCST.
B. Level-2 -- primarily MST responsibility
   1. Results of validation experiments involving research cruises, field experiments and the data will be provided by MST to SDST for testing at the PGS.
   2. Test data sets will be exchanged between SDST and MST to ensure consistent output.
   3. Any changes in algorithms or new algorithms will undergo complete testing using MST-supplied test data sets at the TLCF by the SDST before submission to the Algorithm Integration Facility (AIF) of ECS. (This assumes that in the post-launch phase all updated and new algorithms will be sent to the AIF before being incorporated into the DADS.
C. Utility algorithms will be updated as a result of post-launch validation and sent to the DADS.
D. The final User's Guide will be updated to record all of the results of the post-launch validation tests.